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Literature Survey of Image Retrieval Using Data Mining Clustering Technique

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Abstract- Data mining is the process of extract knowledge from an existing data, among the data sets image data is one is always huge by itself. The usage of this data is increasing rapidly due to his popularity. They are being used in every field today, due to that large amount of data are stored in the database every day. Among such stored data retrieval is not easy; we need a mechanism to group the data's for fast retrieval. In this paper we discussed some of the existing clustering techniques for clustering the data's.

Keywords— Data Mining, Image Mining, Clustering, Hierarchical Clustering, Cheameleon, Data Base, Image Retreival

INTRODUCTION

Data mining (the analysis step of the "Knowledge Discovery in Databases" process, or KDD), a relatively young and interdisciplinary field of computer science, is the process that results in the discovery of new patterns in large data sets. It utilizes methods at the intersection of artificial intelligence, machine learning, statistics, and database systems. The overall goal of the data mining process is to extract knowledge from an existing data set and transform it into a human-understandable structure for further use. Besides the raw analysis step, it involves database and data management aspects, data preprocessing, model and inference considerations, interestingness metrics, complexity considerations, post-processing of found structures, visualization, and online updating.

The term is a buzzword, and is frequently misused to mean any form of large-scale data or information processing (collection, extraction, warehousing, analysis, and statistics) but is also generalized to any kind of computer decision support system, including artificial intelligence, machine learning, and business intelligence. In the proper use of the word, the key term is discovery, commonly defined as "detecting something new". Even the popular book "Data mining: Practical machine learning tools and techniques with Java" (which covers mostly machine learning material) was originally to be named just "Practical machine learning", and the term "data mining" was only added for marketing reasons. Often the more general terms "(large scale) data analysis", or "analytics" - or when referring to actual methods, artificial intelligence and machine learning - are more appropriate.

CHAMELEON ALGORITHM

Input image is clustered based on pixel values of frames by using chameleon algorithm; it uses a graph partitioning algorithm to cluster the sparse graph data objects into a large number of relatively small sub clusters. It then uses an agglomerative hierarchical clustering algorithm to find the genuine clusters by repeatedly combining these clusters using the connectivity and closeness measures. CHAMELEON algorithm has been derived based on the observation of the weakness of two popular hierarchical clustering algorithms, CURE and ROCK. CURE and related schemes ignore information about the aggregate inter-connectivity of objects in two different clusters, they measure similarity between two clusters based on the similarity of the closest pair of the representative points belonging to different clusters. ROCK and related schemes ignore information about the closeness of two clusters while

CHAMELEON uses k-nearest neighbor graph approach to represent its objects. This graph captures the concept of neighborhood dynamically and results in more natural clusters. The neighborhood is defined narrowly in a dense region, whereas it is defined more widely in a sparse region.

LITERATURE SURVEY

What Do Family Caregivers of Alzheimer's Disease Patients Desire in Smart Home Technologies

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PROBLEM FORMULATION

Aim of the paper was to investigate the representations, wishes, and fears of family caregivers (FCs) regarding 14 innovative technologies (IT) for care aiding and burden alleviation, given the severe physical and psychological stress induced by dementia care, and the very slow uptake of these technologies in our society.

RESEARCH DESIGN

A cluster sample survey based on a self-administered questionnaire was carried out on data collected from 270 families of patients with Alzheimer's disease or related disorders, located in the greater Paris area. Multiple Correspondence Analysis was used in addition to usual statistical tests to identify homogenous FCs clusters concerning the appreciation or rejection of the considered technologies.

CONCLUSION

Our study determined two major opposite trends in the opinions of family or voluntary caregivers concerning smart home technology, and provided further evidence of the contrasted status of technology in caregivers' perception: rejection or mitigated appreciation of several technologies, and great confidence in the helpfulness of a few of these[1]

The study clearly shows that the more appreciated smart home technologies are those which increase the patient's safety while decreasing the caregiver's fear of wandering away or accident, and those which increase the caregiver's social connectedness and freedom to leave home at any time. Design of smart home technologies should take this into account to gain user acceptance. However further research will be needed to demonstrate the efficacy of technological resources in improving affect, coping, psychological well-being, and stress management, and to pass this data to family caregivers and health professionals. Such research should be carried out with an 'ethical intention' both to protect patients and caregivers against misuse (32), and to maximize beneficial effects.

LIMITATION

Due to the self-administered form of the enquiry and the age of caregivers, the first drawback of the methodology was the foreseeable difficulty for caregivers to properly understand the whole set of questions and to answer by the questionnaire themselves. The great number of questions and sub-questions increased this difficulty [2] the second drawback of the self-administered questionnaire is the possible selection bias of the study. Indeed, it is conceivable that the people who were the most sensitive to the use of such technologies, either positively or negatively, were those most motivated to respond to the survey; these strong opinions then would appear as the result of the survey. These opinions might explain the U shaped distributions of responses. As a consequence, such a highly significant distribution shape might not be representative of the entire population.

IMPLICATIONS

Today, despite markedly available new devices and the growing development of such programs, family caregivers remain physically and psychologically overstrained by the heavy care burden, which has a bearing on the quality of care, they give. Distribution and up taking of these new tools and resources is so poorly developed that personalized care plans and coping aids do not even mention them. So, there is a need to better understand the how and whys of the discrepancy between the available technology and the way AD FCs perceive it. Studies on needs, perceptions, and expectations of AD patients and their caregivers regarding assistive technologies have been studied so far through three main approaches: a) direct users' position through end user focus groups or in-depth face-to-face interviews; b) self-administered questionnaire; and c) ethnographic studies [3].

End user focus groups or in-depth face-to-face interviews are aimed at collecting the users' opinion through free expression, individually or in small groups. They are widely used by searchers or evaluators for the assessment of specific tools and services. They are usually costly and time consuming, and thus usable only for small scale assessment procedures. The self-administered questionnaire approach is based on a set of questions, preferably very simple for the sake of understanding, sent to the target persons with a prepaid envelope for returning the filled questionnaire, or filled out over the telephone. This method is used in medium and large-scale studies for statistical purpose. It has been successfully applied to technology in the AD domain.

II- The Gator Tech Smart House: A Programmable Pervasive Space

PROBLEM FORMULATION

Many first-generation pervasive computing systems lack the ability to evolve as new technologies emerge or as an application domain matures. Integrating numerous heterogeneous elements is mostly a manual, ad hoc process. Inserting a new element requires researching its characteristics and operation, determining how to configure and integrate it, and tedious and repeated testing to avoid causing conflicts or indeterminate behavior in the overall system [4] the environments are also closed, limiting development or extension to the original implementers.

RESEARCH DESIGN

Florida's Mobile and Pervasive Computing Laboratory is developing programmable pervasive spaces in which a smart space exists as both a runtime environment and a software library.1 Service discovery and gateway protocols automatically integrate system components using generic middleware that maintains a service definition for each sensor and actuator in the space [5].

Programmers assemble services into composite applications, which third parties can easily implement or extend.

The use of service-oriented programmable spaces is broadening the traditional programmer model. Our approach enables domain experts for example, health professionals such as psychiatrists or gastroenterologists to develop and deploy powerful new applications to users. In collaboration with the university's College of Public Health and Health Professions, and with federal funding from the National Institute on Disability and Rehabilitation Research (NIDRR), we are creating a programmable space specifically designed for the elderly and disabled. The Gator Tech Smart House in Gainesville, Florida, is the culmination of more than five years of research in pervasive and mobile computing. The project's goal is to create assistive environments such as homes that can sense themselves and their residents and enact mappings between the physical world and remote monitoring and intervention services.

CONCLUSION

Pervasive computing is rapidly evolving from a proven concept to a practical reality. After creating the Matilda Smart House, a 900- square-foot laboratory prototype designed to prove the feasibility and usefulness of programmable pervasive spaces as assistive environments, we realized that hacking hardware and software together resulted in some impressive demonstrations but not something people could actually live in [6]. We designed the second-generation Gator Tech Smart House to outlive existing technologies and be open for new applications that researchers might develop in the future. With nearly 80 million baby boomers in the US just reaching their sixties, the demand for senior-oriented devices and services will explode in the coming years. Ultimately, our goal is to create a "smart house in a box": off-the-shelf assistive technology for the home that the average user can buy, install, and monitor without the aid of engineers. In the future, we intend to redeploy the smart floor using our own sensor platform technology, which will include spatial awareness. This will greatly simplify the installation process and aid in determining the location of one tile relative to another. We will only need to manually specify the position of one tile, and then the system can automatically generate the mapping between sensors and physical locations.

LIMITATION

Creating a scalable self-sensing space is impractical using existing pervasive computing technologies.4 Most smart appliances available in the market today do not contain a controllable interface[7]. In addition, numerous available protocols are incompatible. For example, the X10 protocol offers an easy, affordable way to turn a house into a smart one, but many smart devices are not X10 enabled. Regardless of the technology used, a smart space should be able to communicate with any new smart device.5, 6 While this technology provides precise user position and orientation measurements, it was inappropriate for the Smart House. Each room would require a full set of expensive pilots, and residents would have to don special equipment, which is extremely intrusive and defeats the desired transparency of a pervasive computing environment.8, 9 Instead, we opted to embed sensors in the floor to determine user location.10-12 The benefit of not encumbering users outweighed the loss of orientation information, and the availability of an inexpensive sensor platform made this solution extremely cost-effective.

IMPLICATIONS

Most of the "hot spots" that are currently active or under development in the Gator Tech Smart House. An interactive 3D model available at www.icta.ufl.edu/gt.htm provides a virtual tour of the house with up-to-date descriptions of the technologies arranged by name and location [8].

Smart mailbox: The mailbox senses mail arrival and notifies the occupant.

Smart front door: The front door includes a radio-frequency identification (RFID) tag for keyless entry by residents and authorized personnel. It also features a microphone, camera, text LCD, automatic door opener, electric latch, and speakers that occupants can use to communicate with and admit visitors.

Driving simulator: The garage has a driving simulator to evaluate elderly driving abilities and gather data for research purposes.

Smart blinds: All windows have automated blinds that can be preset or adjusted via a remote device to control ambient light and provide privacy.

Smart bed: The bed in the master bedroom has special equipment to monitor occupants' sleep patterns and keep track of sleepless nights.

Smart closet: The master bedroom closet will, in the future, make clothing suggestions based on outdoor weather conditions.

Smart laundry: In combination with the smart closet, future RFID-based technology will notify residents when to do laundry as well as help sort it.

Smart mirror: The master bathroom mirror displays important messages or reminders—for example, to take a prescribed medication—when needed. This technology could be expanded to other rooms.

Smart bathroom: The master bathroom includes a toilet paper sensor, a flush detector, a shower that regulates water temperature and prevents scalding, and a soap dispenser that monitors occupant cleanliness and notifies the service center when a refill is required. Other technologies under development measure occupant biometrics such as body weight and temperature.

III-A Fuzzy Embedded Agent-Based Approach for Realizing Ambient Intelligence in Intelligent Inhabited Environments

PROBLEM FORMULATION

In this paper we describe a novel life-long learning approach for intelligent agents that are embedded in intelligent environments. The agents aim to realize the vision of ambient intelligence in intelligent inhabited environments (IIE) by providing ubiquitous computing intelligence in the environment supporting the activities of the user. An unsupervised, data-driven, fuzzy technique is proposed for extracting fuzzy membership functions and rules that represent the user's particularized behaviors in the environment.

The user's learned behaviors can then be adapted online in a life-long mode to satisfy the different user and system objectives. We have performed unique experiments in which the intelligent agent has learned and adapted to the user's behavior, during

A stay of five consecutive days in the intelligent dormitory (iDorm), which is a real ubiquitous computing environment test bed. Both offline and online experimental results are presented comparing the performance of our technique with other approaches. The results show that our proposed system has outperformed the other approaches, while operating online in a life-long mode to realize the ambient intelligence vision.

RESEARCH DESIGN

An environment with ambient intelligence can be characterized by its ubiquity, transparency and intelligence. It is ubiquitous because the user is surrounded by a multitude of interconnected embedded systems which form a pervasive infrastructure. Its transparency is due to the invisible nature of the computing-based artifacts being seamlessly integrated into the surrounding environment [9]. Its intelligence spawns from the fact that the technology is able to recognize the users and program itself to their needs by learning from their behavior. In addition, environments constructed in such a way would be adaptive to changing conditions and user preferences.

One approach to achieve this vision of ambient intelligence is to embed intelligent agents in the user environments so that they can control them according to the needs and preferences of the user. In this paper, we will present a novel fuzzy learning and adaptation technique for agents that can be embedded in ubiquitous computing environments. This technique would learn and adapt in a life-long mode the particularized behaviors of the user and automatically adjust the agent controller based on a broad range of parameters in a nonintrusive and invisible way, satisfying one of the main requirements for ambient intelligent systems [10]. Furthermore, the agents will always and immediately carry out any action requested by the user, subject to safety considerations to achieve the responsive property implied in the ambient intelligence vision. Due to the fact that these agents need to be located on small embedded computers with limited processor and memory capacities, our learning and adaptation system is a one-pass method which does not require heavy computation.

CONCLUSION We presented a novel fuzzy learning and adaptation technique for agents that can be embedded in ubiquitous computing environments. This, we hope, will be a step toward the realization of the vision of ambient intelligence. Our agent learned an FLC that modeled the user's particularized behavior and it was adaptive as it allowed the learned behaviors to be modified and extended online and in a life-long learning mode as the user's activity and environmental conditions changed over time. The intelligent learning and adaptation occurred in a nonintrusive manner while the user carried out his normal activities in the environment. The agent was always responsive to the user's commands. The iDorm environment was also transparent and ubiquitous in that the pervasive infrastructure of the interconnected embedded systems was seamlessly integrated into it. The user was therefore surrounded by an invisible though intelligently responsive ambience.

Our technique was a simple one-pass method and thus it is not computationally expensive and could be incorporated in many embedded devices within intelligent environments. We carried out unique experiments in which a user stayed in the iDorm for five consecutive days. The proposed AOFIS technique was compared with other soft-computing based approaches; namely a GP, ANFIS and an MLP. The offline results showed that the optimum performance of AOFIS produced on average a lower scaled RMSE and standard deviation than both ANFIS and the MLP, and was computationally less intensive and better suited to online learning than the other approaches compared. The online operation of the agent showed that AOFIS was effective at both learning the behaviors of the user and adapting and tuning its rules online to meet the user's preferences, without incurring any kind of cognitive loading on the user.

LIMITATION

We can deduce that the agent has tried to realize the vision of ambient intelligence as it was intelligent and it learned the user particularized behavior and adapted it online to any changes in a life-long learning mode in a nonintrusive way. The agent was also responsive to the user commands. In addition, the intelligent environment in the iDorm was transparent and ubiquitous in that the pervasive interconnected embedded systems were seamlessly integrated into it. The user was therefore unaware of the invisible intelligently responsive infrastructure of the environment.

IMPLICATIONS

Proposed technique, which we term AOFIS, is an unsupervised data-driven one-pass approach for extracting fuzzy rules and membership functions from data to teach a fuzzy controller that will model the user's behaviors. The data is collected by monitoring the user in the environment over a period of time. The learned FLC provides an inference mechanism that will produce output control responses based on the current state of the inputs. Our adaptive FLC will therefore control the environment on behalf of the user and will also allow the rules to be adapted and extended online, facilitating life-long learning as the user's behavior drifts and environmental conditions change over time. Our proposed approach aims to fulfill many of the requirements for the ambient intelligence vision defined by the Information Society Technologies Advisory Group (ISTAG) to the European Commission.

1) Monitoring the user's interactions and capturing input/output data associated with their actions;
2) Extraction of the fuzzy membership functions from the data;
3) Extraction of the fuzzy rules from the recorded data;
4) The agent controller;
5) Life-long learning and adaptation mechanism.

IV- Toward Scalable Activity Recognition for Sensor Networks

PROBLEM FORMULATION

Sensor networks hold the promise of truly intelligent buildings: buildings that adapt to the behavior of their occupants to improve productivity, efficiency, safety, and security. To be practical, such a network must be economical to manufacture, install and maintain. Similarly, the methodology must be efficient and must scale well to very large spaces. Finally, be widely acceptable, it must be inherently privacy sensitive. We propose to address these requirements by employing networks of passive infrared

(PIR) motion detectors [11]. They also protect privacy since they are neither capable of directly identifying individuals nor of capturing identifiable imagery or audio. However, with an appropriate analysis methodology, we show that they are capable of providing useful contextual information. The methodology we propose supports scalability by adopting a hierarchical framework that splits computation into localized, distributed tasks. To support our methodology we provide theoretical justification for the method that grounds it in the action recognition literature.

RESEARCH DESIGN

We also present quantitative results on a dataset that we have recorded from a 400 square meter wing of our laboratory. Specifically, we report quantitative results that show better than 90% recognition performance for low-level activities such as walking, loitering, and turning. We also present experimental results for mid-level activities such as visiting and meeting. The system estimates the physical topology of the network and uses that information to form context neighborhoods around each node [12]. Loosely, a context neighborhood is the collection of nodes that have a semantically-grounded link to the central node. That is, nodes form a neighborhood if they are physically near to each other, and the constraints of the space allow people to move freely between their sensor ranges, so that their sensor readings are related to each other by the dynamics of the space. These neighborhoods are the basis for portable behavior recognition and system scalability and we will define the several specific kinds of neighborhood in this paper. The neighborhoods are also defined small enough to be invariant to the larger context of a building. This means that the detectors should be portable from location to location. This fact reduces the overall cost by eliminating much of the on-site calibration and engineering cost. There is no need to accurately position the sensors; they only need to tile the space in a rough grid.

CONCLUSION

These results suggest that a number of context-sensitive applications may soon be not only possible, but practical. An inexpensive sensor network could hence build safety by tuning emergency response to an up-to-the-minute building census. It could enhance security while preserving privacy by providing more complete context information to monitoring systems without the invasiveness or cost of ubiquitous cameras. Current energy saving devices such as motion activated lights tends to be disabled by occupants because they are annoying. By understanding more of the local context, and the habits of the users, it might be possible to build systems that better match the expectations of the people in the building.

LIMITATION

A major issue when observing multiple people is the data association problem: what observations belong to which person? Most systems approach this problem by assuming that individuals are accurately tracked within the space before any interpretation is attempted. In that case, all data is associated to a track first, and the track becomes the representation used by the recognition engine. This approach assumes that the sensors used in the system will have sufficient fidelity and coverage to make tracking possible. That implies either ubiquitous camera coverage, or the presence of tracking and identification tags attached to individual users [13]. In situations where this assumption is valid, the prior literature is already rich with solutions.

IMPLICATION

1 The Node

The Level 0 detector is implemented in hardware, using passive infra-red (PIR) motion detectors. This is the same sensing technology used in most motion activated lights and appliances on the market today. The sensors are inexpensive, approximately $30 per node in quantities of 500. They also require little power: they are able to run on a single nine volt battery for several months. Finally, what little they actually do, they do very reliably. We have used the widely available KC7783R sensor package from Comedia Ltd. The nodes are approximately 2cm by 3cm by 5cm. A node is pictured in Figure 1. As it comes from the factory, the KC7783R is only able to generate events once every few seconds. We modified the boards to reduce the recovery time so that events may be generated at about 1Hz. When an individual is within view of the sensor, the moving heat source changes the thermal signature measured by the device, and a rising voltage edge is generated. The sensor is noisy and sometimes generates both false positive and false negative signals. However it is insensitive to changes in visible lighting, and therefore has a distinct advantage over cameras. The output of the node, at the Level 0, is simply a stream of binary events. When the motion is detected, a sensor-specific ID is broadcast over a wireless network. In our research prototype system, the packet is associated to a global time stamp and copied to a conventional LAN for central storage and analysis

2 The Cluster

The goal of a cluster is to process the binary motion activation events from its participant sensor nodes at level 0 and classify them into one of the 17 movements. The 17 movements to recognize are: entering, leaving, turning top-right, turning-top-left, turning-bottom-right, turning-bottom-left, turning right- bottom, turning-right-up, turning-left-bottom, turning-left-up, walking-up, walking-down, walking-right, walking-left, still, and join, split. Note that the goal is not only to recognize if a person is ”turning” but which direction (right vs. left and top vs. bottom) the person is turning to with respect to an arbitrary reference point shared by all nodes.

IV CONCLUSION AND FUTURE ENHANCEMENT

While this is a useful advancement in the field of smart environment technologies for health monitoring and assessment, there is still additional research that can be pursued to enhance the algorithms. Currently, the user specifies a desired number of activities to cluster and model. In future work, we will investigate methods for automatically selecting this number based on the resident's lifestyle. We will also investigate methods for seeding the clusters based on smart environment information and for incrementally modifying the patterns, clusters, and models as activities change over time.

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