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| --- | --- | --- | --- | --- | --- | --- |
| Technical aspects | | | | | | |
| Online Learning | Information filtering method | Relevance feedback | User profile Management techniques | Data Mining techniques | Data Mining category | ID |
| No | Similarity ranking  Collaboration Filtering | yes | Ranking the profile by expert | Cluster  ranking | Unsupervised | 01 |
| NO | Knowledge based filtering (Role based) | no | Extract and used roles | The Kaplan-Meier method (rough sets, survival analysis and rule-based) | Heuristic | 02 |
| No | Similarity ranking  Collaboration Filtering | yes | Ranking profiles by users | k-neighborhood based on Euclidian distance | Unsupervised | 03 |
| No | Multi criteria context aware filtering | yes | Get user preference and GPS data | FINLP–OWA optimizing | Unsupervised | 04 |
| No | Hybrid | yes | Vector space  model | Fuzzy linguistic modeling | Unsupervised | 05 |
| yes | Knowledge based filtering (case based) | yes | Mobile GPS, and other sensors | classification | reinforcement | 06 |
| No | Hybrid (Collaborative & Demographic based) | yes | Get user preference | K Nearest neighbour | Unsupervised | 07 |
| no | Knowledge based filtering (case based) | yes | Get user preference | Heuristic model | Heuristic | 08 |
| No | Collaboration Filtering | No | Standard Datasets | Random Forest,  Ada Boost,  Extra Trees,  Multi-Layer Perceptron | Supervised | 09 |
| No | Collaboration Filtering & Ontology | Yes | User properties | Cluster  Users | Unsupervised | 10 |
| No | Collaboration Filtering | No | Get user preference | Classification and regression tree (CARD) | Supervised | 11 |
| No | Content-based filtering +knowledge-based (case-based)  Techniques  (Hybrid) | Yes | User-item ratings matrix,  Vector space model, Historybased model | Heuristic model | Heuristic | 12 |
| No | knowledge-based  Techniques (rule-based, case-based and preference-based reasoning) | Yes | Extract rules and cases by experts | Cluster  Users (K-NN) | Unsupervised | 13 |
| No | knowledge-based  Techniques (case-based) | No | Generate lifestyle profile by sensors and health monitoring devices | Decision Tree-Based | Supervised | 14 |
| No | Content-based filtering with semantic ontology | No | User properties | Heuristic model | Heuristic | 15 |
| No | Collaboration Filtering | No | Get family members Opinions | Heuristic model | Heuristic | 16 |
| No | Knowledge based filtering (case based) | yes | Get Expert preference | Heuristic model | Heuristic | 17 |
| No | Similarity ranking  Collaboration Filtering | Yes | collect emotional data of users | Decision Tree  SVM | Supervised | 18 |
| No | Collaboration Filtering | No | Used medical history of patients | K-Means  K-NN  W-InCF clustering | Unsupervised | 19 |
| No | Knowledge based filtering (role based) | No | Get vital signs data by sensors | Heuristic model | Heuristic | 20 |
| No | Collaboration Filtering | No | Matrix of rough set based predictions | Heuristic model | Heuristic | 21 |
| No | Knowledge based filtering (case based) | No | Used attributes of the diagnosis case data | SVM  ID3 decision tree  BP neural network | Supervised | 22 |
| No | multi-criteria Collaboration Filtering | No | Used Health products attributes | Expectation Maximization  clustering | Supervised | 23 |
| No | Collaboration Filtering  Knowledge based filtering (role based) | Yes | Used medical history of patients dataset | K-Means  K-NN  FB-InCF | Unsupervised | 24 |
| No | Knowledge based filtering (case based) | No | Get vital signs data by sensors  And user demographics | Random forest  Decision tree  CNN | Supervised | 25 |
| No | Knowledge based filtering (case based) | yes | Used attributes of the diagnosis of SchizConnect data set | k-nearest neighbours  Random forest  Decision tree  xgboost | Supervised | 26 |
| No | Knowledge based filtering (case based) | No | Generate by simulator | Heuristic model | Heuristic | 27 |
| No | Collaboration Filtering | No | Used hospital ranking dataset | MF  SVD  WSVD  RBM  RBM-CNN | Supervised | 28 |
| No | Knowledge based filtering (case based) | No | observations of heart disease patient for classification by deep learning methods | LS with  SVM  GDA with LSSVM  LDA with  ANFIS  MKL with  ANFIS | Supervised | 29 |
| NO | Collaboration filtering | yes | Ranking the profile by user, | N/A | supervised | 30 |
| No | knowledge based | yes | Ask the user about personal information,  Collect user information via social networks and wearable devices | Logistic regression | supervised | 31 |
| No | Knowledge-Based filtering | No | DataSet (EHR)  wearable sensors | Learner regression classifier (LR)  Na¨ıve Bayes(NB)  Random forest(RF)  K-nearest neighbors(KNN)  Decision tree(DT)  Support vector machine(SVM) | Supervised | 32 |
| N/A | Colabration filtering | No | Body sensors  Smart devices  Smart phones | Random forest  Decision tree  SVD  CNN | supervised | 33 |
| no | Sample Dataset  ,Dataset  Preprocessing,  Apriori and Eclat  ,TF-IDF and Similarity Metric,  Model Training | yes | central database through IBM  cloud | Content-Based Recommender (CBR) system consisting of  K-Nearest Neighbors (KNN) and Association Rule Mining (ARM) | unsupervised | 34 |
| no | Knowledge-based  Rating | yes | Ranking    Data set(384 enjoyable list)  GPS and wether | Linear Mixed-Effects (LME) model  Classification | Heuristic | 35 |
| No | Context-aware Filtering | No | sensors | Regression | Supervised | 36 |
| No | collaborative filtering | yes | user-based and message-based | hybrid machine learning algorithm | Supervised | 37 |
| no | Knowledge based | no | Get user information and preferences | Classification | Supervised | 38 |
| no | content-based (based on the relations between the items) | no | ----- | MER | heuristic | 39 |
| No | Collaboration Filtering  Content-based Filtering  Hybrid | No | Get user preferences | ranking | Unsupervised | 40 |
| No | Knowledge based filtering (case based) | No | Get user preferences | Heuristic model | Heuristic | 41 |
| No | collaborative filtering(Used Community-based filtering) | No | GPS & Bio sensors | Classification(SVM) | supervised | 42 |
| No | collaborative filtering | No | Get user preference | feed-forward neural networks | heuristic | 43 |
| No | Collaborative filtering | Yes | BCCD (Breast Cancer Coimbra Dataset) | ANN, ELM, SVM, KNN | Supervised | 44 |
| no | Regarding the collaborative filtering (CF) | no | Hybrid system combines technique | Collection of traditional information | supervised | 45 |
| No | collaborative filter | No | block chain | fuzzy  clusters | unsupervised | 46 |
| No | conversational recommender system (Hybrid) | yes | Fuzzy logic | Fuzzy logic | Heuristic | 47 |
| YES | knowledge-based filtering | YES | Ranking profiles by users | Chronic Disease Patient Education Ontology (**CDPEO**) | Heuristic | 48 |
| NO | knowledge-based filtering | No | Fuzzy logic | Fuzzy logic | Heuristic | 49 |
| No | collaborative filtering content-based filtering | No | user’s preference and user’s health | Neural network model Classification, Association rule | supervised | 50 |
| No | Collaborative filtering | Yes | Questions related to the patient’s basic demographic information,  Users’ physical activity data will be collected using their mobile phones. | Kaplan-Meier method (with linear regression analysis to analyze the overall survival rate (non-smokers)) | Heuristic | 51 |
| No | hybrid | No | Get user preference and using sensors | Multilayer perceptron,  Simple logistic,  Bayes net,  Naïve Bayes,  Decision table,  Random forest | Supervised | 52 |
| no | User-Based Collaborative Filtering | no | Doctors' prescription | Atc code | heuristic | 53 |
| NO | Content-Based Filtering | NO | Dataset | Classification | Supervised | 54 |