

Inter-IIT Tech Meet 2018

IIT Bombay



TV Audience Measurement

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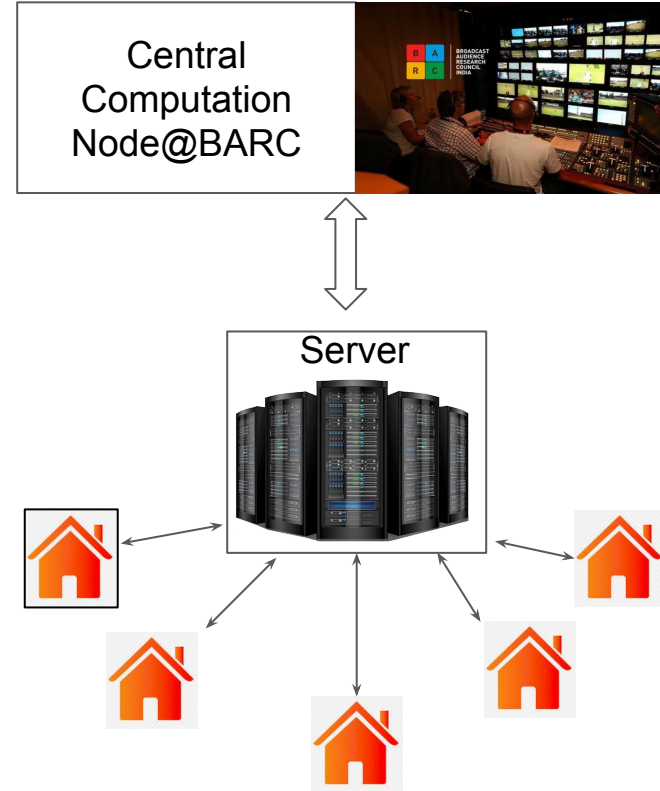
Tanmay Patil

System Overview

- **User end** : Channel identification, timestamp, age and gender recognition
- **BARC server end** : All computations including Channel, Ad Classification and Recognition
- Channel viewed by users and detected content are matched and logged at server end
- Universal sync of timestamp using GPS

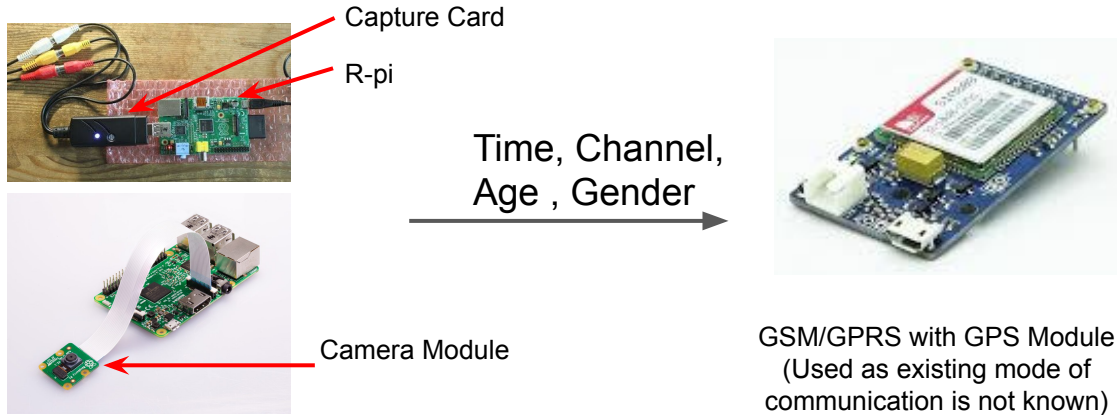


User-Level Hardware



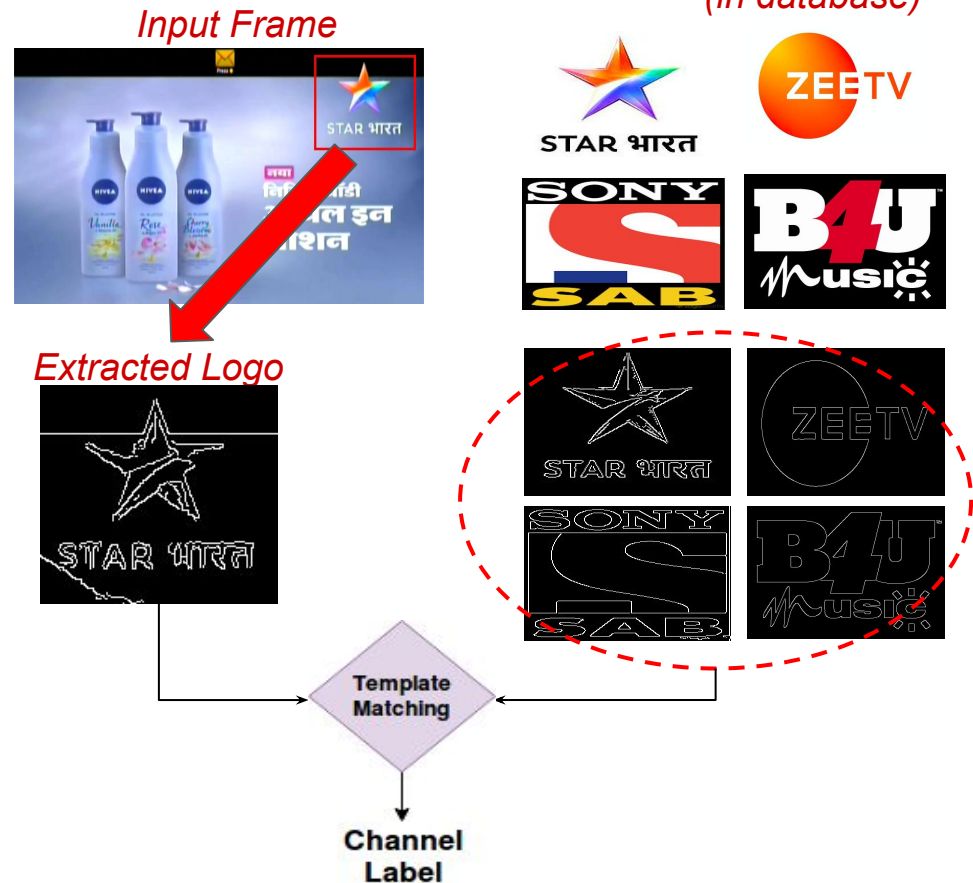
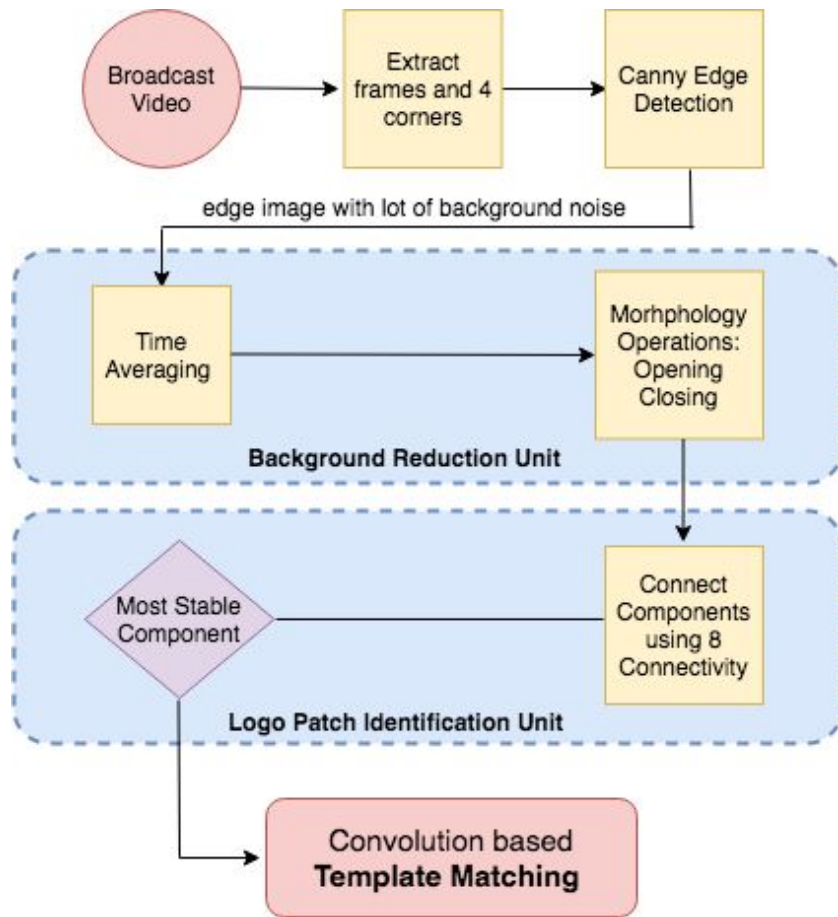
System Hardware

Hardware module at home : capture card, R-pi zero and GSM/GPRS module



Hardware module at Central Node : X channels, X parallel processing threads

Logo Based Channel Identification



Advertisement and Content Classification

US and European countries advertisement standards



BARC implementation :



Indian advertisement standards : **no black frames**¹

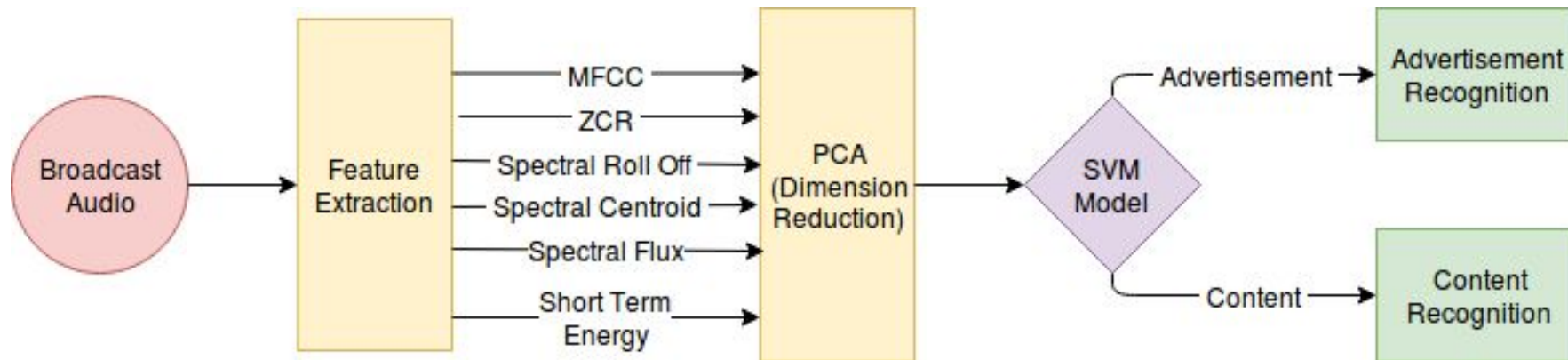
CONS

Dependence on broadcaster

Need for Ad/Content Classification:

- Content detection through audio is difficult
- Ad detection using video : Lot of redundant information
- Two different modules required for ad and content recognition

Advertisement and Content Classification



- Boosting techniques employed to improve SVM
- Individual audio frame classification accuracy : **91.2%**
- Majority vote over 30 frames used to classify between Ad and Content : **91.2%** accuracy gets refined with each frame

Advertisement Recognition

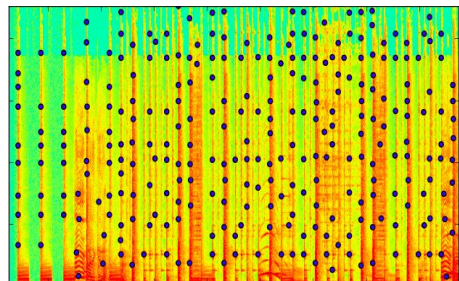
Pros

- No dependency on broadcasters
- High Accuracy

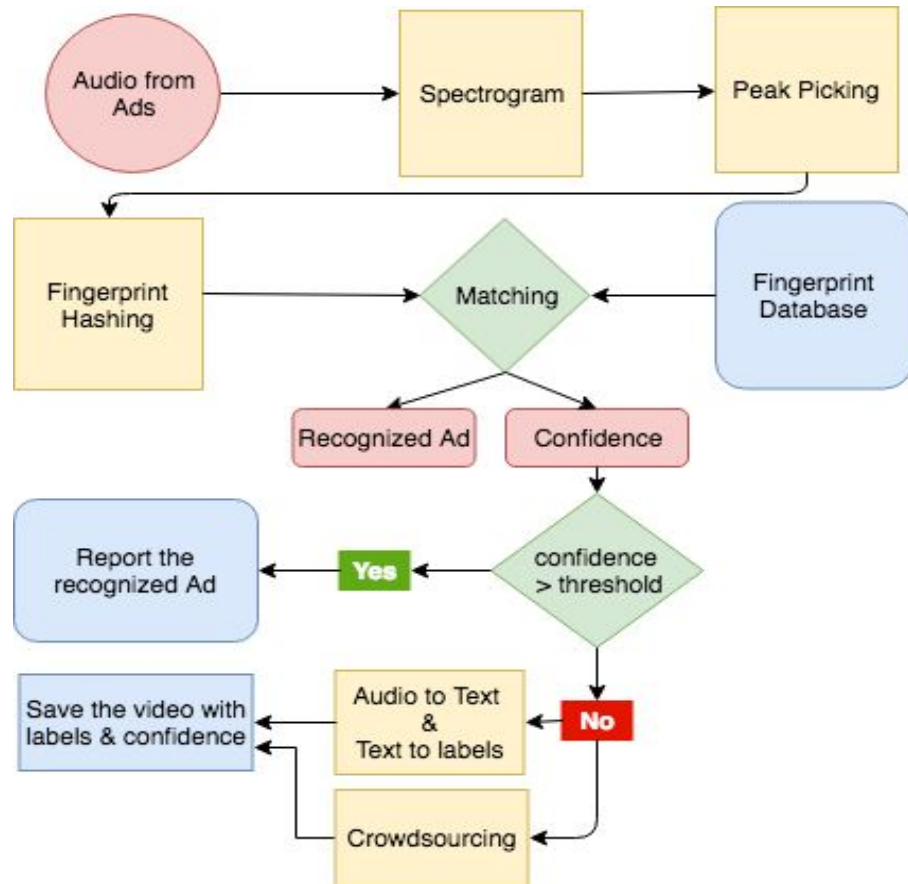
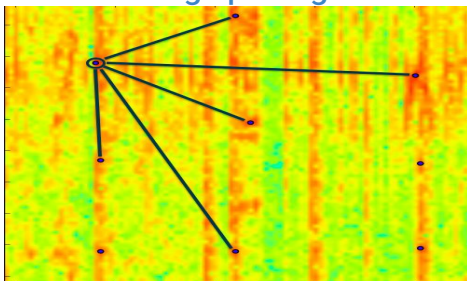
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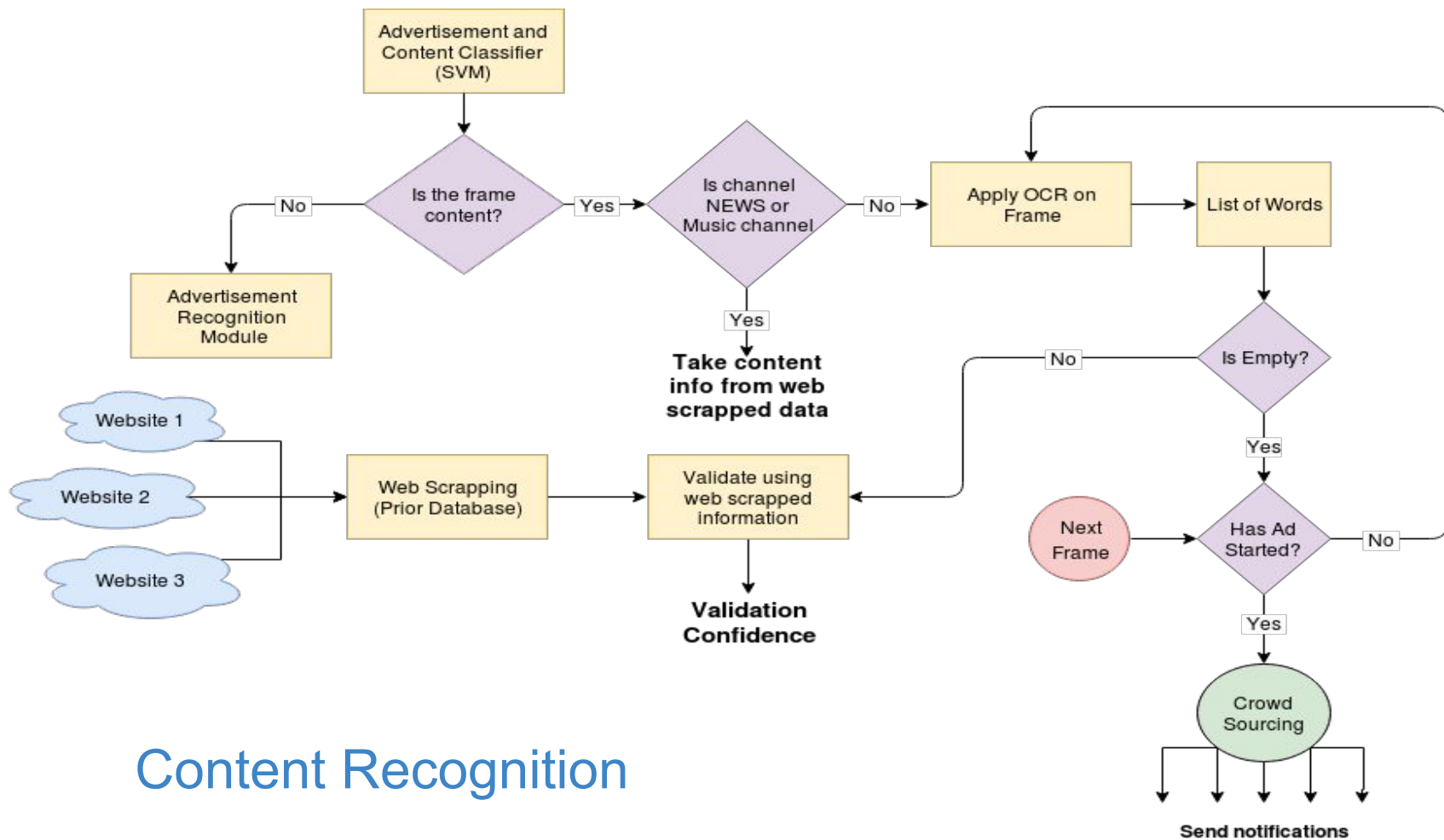
New ads are annotated but need manual inspection

Peak-Picking on Spectrogram



Fingerprinting

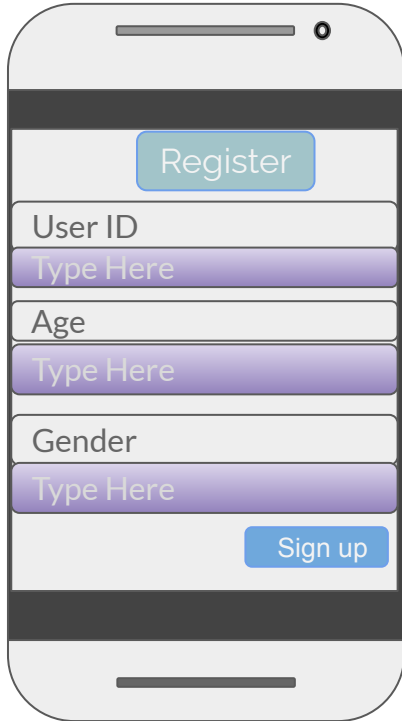




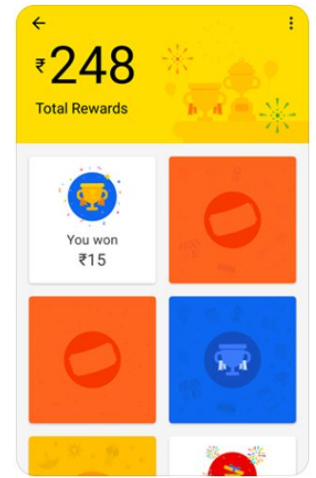
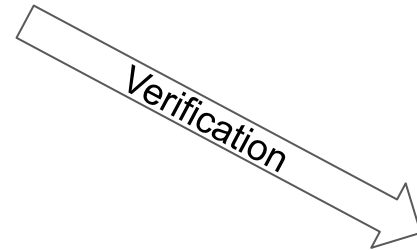
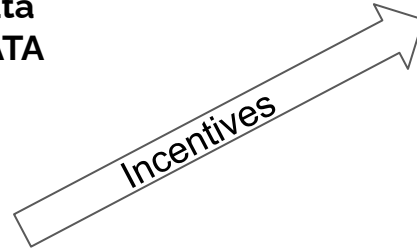
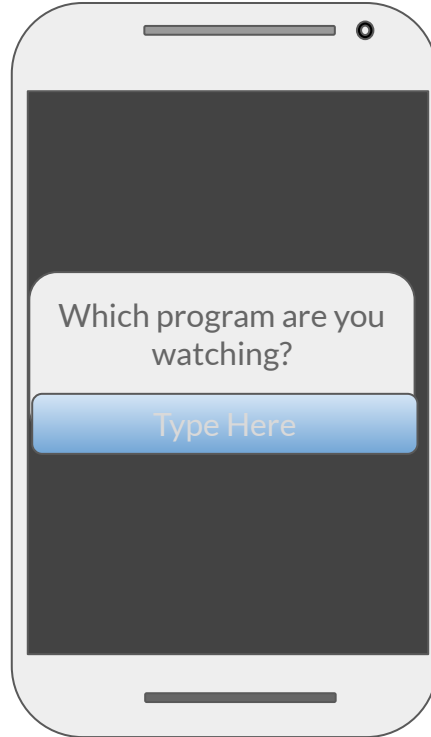
Content Recognition

Incentive based Smartphone App

Collect Age and Gender information



Ask questions to collect data
CROWD-SOURCING, BIG DATA



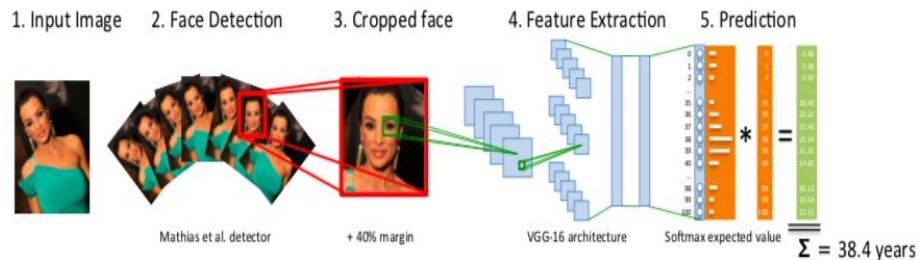
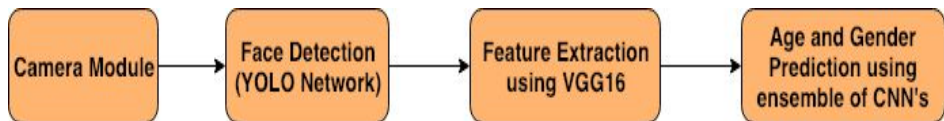
Scratch Cards

Record TV audio



Age and Gender Recognition

Camera based solution



1. Age, gender, channel & timestamp sent to BARC. **No image content sent**
2. Completely Automatic System. No hardware device
3. Multiple viewers detected
4. **Robust** and **reliable** solution : Inactivity and Emotion detection

Camera use : Privacy issues

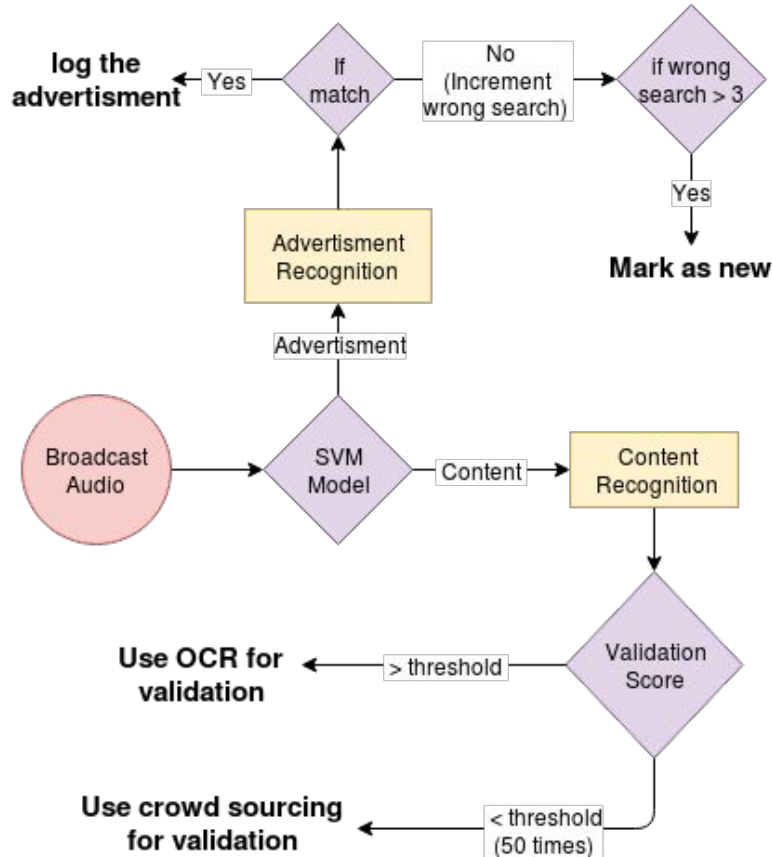
Mobile App based solution



Cons

- Error prone due to lack of care from user
- Internet Connectivity of Smartphones
- Manual Labour

Overall System & Corner Cases



- ✓ Ad to Ad and Ad to content transitions are handled
- ✓ Taking care of inaccurate predictions by SVM
- ✓ New advertisement detection and labelling
- ✓ Verification of web-scraped data
- ✓ User inputs validation
- ✓ Channel logo change detection

Conclusions & Future Work

Pros

- We have completely eliminated the dependency on the broadcasters
- Highly accurate Ad/Content detection and identification system
- Big data is used to increase the robustness of the system using the concept of crowdsourcing
- We have significantly reduced manual labour by automation

Cons

- Not a completely hardware free system
- Non-intuitive implementation

Future Work

- Researchers in MIT are working on detecting person's emotions using wireless signals. We plan to work on similar lines in the future.
- Performing case studies to estimate crowdsourcing parameters like reliability, rewards and belief
- Formalizing the work done till now in form of an extensive technical report