**An Intelligent Transport System (ITS) For Developing Regions**

**Motivation for ITS**
- Too many vehicles, too little road
- Infrastructure growth slow due to lack of funds, space and bureaucratic issues
- Allocating problem using technology

**State of the art in ITS**

**Contributions**
- Can handle chaotic traffic: higher the chaos, more is the amount of honking, better is the performance.
- Our algorithm gives fairly accurate speeds in practice.
- Low cost: each acoustic sensing unit will cost around $20.
- Two sample KS and MVLV tests show statistical divergence of congested and freeflow states at 99% confidence level for each of the four metrics.
- Can differentiate traffic states in two directions on the same road.
- Can detect onset of congestion.

**System Architecture : Doppler Shift of Honks**

**Questions**
- How to estimate vehicle speeds from honks?
- Are there enough honks on road?
- Will estimated speeds represent the traffic state?
- Can congested vs freeflow traffic states be distinguished?
- What other non-speed based acoustic metrics can be used to identify traffic states?

**Algorithm Design : Challenges**
- How to detect honks in presence of significant road noise?
- How to match honks across two acoustic sensors?
- How to extract f1 and f2 from a pair of matched honks?

**Extensive Road Experiments**

**Road Experiments**
- 18 hours of road-data collection
- 2 different roads
- Different times of the day
- Different weather conditions

**Contributions**
- 1) PeakVsAvgAllFreq
- 2) PeakAbsAmp
- Varying vehicle speed

**Frequency Extraction**

**Contributions**
- Statistical divergence tests
- Use four metrics, with 99% confidence using Mann-Whitney U and two sample Kolmogorov-Smirnov test

**Conclusions**

**Future Work**
- Deploying sensors for automated data collection.
- Planning optimal sensor placement.
- Developing algorithms for real-time data classification based on historical values.
- Correlating data from various sensors to estimate travel time.
- Designing mobile applications to provide ITS.

**Publications**
- Rijurekha Sen, Bhaskaran Raman, Prashima Sharma, “Horn-Ok-Pleasing”, Mohiyuddin10 (under submission).