ZIKA: improved surveillance and forecast of Zika virus in Brazil

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Background:
The devastating consequences in neonates infected with Zika virus make controlling the spread of the virus and its vectors (Aedes mosquitoes) an urgent challenge. Mobile technology has been successfully used to support routine surveillance of mosquito populations conducted by the community health workers (health agents). Mobile real-time surveillance data also provides a ground truth for calibrating early-warning and prediction systems.

Methods:
The ZIKA app supports the health agents in routine surveillance of properties with risk of mosquito breeding, recommends the most optimal route to visit the assigned properties, and includes gamification features, such as badges, to reward healthcare agents for successfully completing the surveillance tasks. Secondly, the project developed a model of the vector population spread using neural networks and artificial intelligence methods combing data from healthcare agents and mosquito ovitraps from the period 2009-2014, with climatic and weather data, calibrated by the real time data from the ZIKA app.

Results:
The results from testing sessions demonstrated the app could replace the very time consuming paper-based systems and provide an improved surveillance data available at real time, for seamless reporting to the regional authorities. Using the 2009-2014 dataset, the neural network model successfully predicts mosquito occurrence in the high risk regions of the city of Recife.

Conclusions:
The ZIKA mobile app provides a much improved surveillance of the mosquito populations and real-time data for the public health authorities responsible for rapid response. The AI early warning model successfully predicts mosquito populations using healthcare agents data, weather and climatic data.

Key messages:

- ZIKA project developed a mobile app to improve surveil- lance of mosquito
- population in tropical regions of Brazil. ZIKA early warning system, using AI neural networks, has the potential to predict the risk of mosquito populations in high risk urban locations.