

MOOC 2.0: A case for India

Raviteja Garlapati

Canopus Consulting affiliation
128, 14th cross, HAL 2nd stage
Indiranagar, Bangalore-560038
+91-80-42036844

ravi@canopusconsulting.com

Soma S Dhavala

Canopus Consulting affiliation
128, 14th cross, HAL 2nd stage
Indiranagar, Bangalore-560038
+91-80-42036844

soma@canopusconsulting.com

Nagaraju Pappu

Canopus Consulting affiliation
128, 14th cross, HAL 2nd stage
Indiranagar, Bangalore-560038
+91-80-42036844

pnr@canopusconsulting.com

ABSTRACT

Massively Open Online Courses transformed the technology enabled education. They promise democratization of education by making quality education accessible to all - irrespective of space, time and economic barriers. The leading MOOC platforms such as Courseera, Udacity, Udemy and eDx demonstrated effective use of technology to reach unprecedented scale. Typical enrolments in a course can be in hundreds of thousands. Though MOOCs enabled access to high quality content, and achieved massive scale of operations, many published studies have shown important limitations such as very high dropout ratios, small percentage of completion and lack of trusted assessment models.

The early criticism of MOOC model was that they are inherently elitist. Only highly motivated and talented students complete the courses. This is because, all students are assumed to have the same or similar abilities, and therefore the model does not provide individual attention depending on the learner's profile and ability. There is practically no contact with the faculty and there is very little push to completion. The large MOOC platforms are making rapid innovation to address these limitations - they provide coaching, some of them now provide a bunch of courses instead of treating each course as independent from the other, and there are even early experiments to provide a complete university degree purely in an online delivery model.

In this paper, we propose a next generation MOOC architecture and the role of data sciences for large and diverse developing country such as India. India is a young country with close to half a billion young people who will need employment in the next two decades. The current educational system of India is not capable of scaling up to such high volumes. There is also a high disparity in terms of the quality of education between the premier institutions and average institutions. Recent studies have shown that more than unemployment, unemployability is the bigger problem. The employers require critical thinking, problem solving, communication skills, whereas the pedagogic model is based on rote learning, inflexible theoretical approaches and does not involve team work etc.. More importantly, fifty percent of the students from rural India are not even familiar with basic usage of computers. There are very few premier institutions such as IITs and NITs which provide quality education. This creates a large gap in the availability of teaching expertise. In addition to this, each university and state will have their own requirements and curriculum.

In order to address these issues, the MOOC architecture for Indian environment and other developing countries must be very different. We have to create communities of teaching and

learning. We have to provide mechanisms for holistic skill development across courses. We have to enable faculty from premier institutions to create course content not for end user (the students), but for their peers (teachers) in other institutions. We have to enable dynamic environments where local language summaries, creation of exercises and learning activities as per the local requirements are possible. If the present day MOOCs are akin to web1.0, our architecture is akin to Web3.0 - as it is created for communities of people instead of individuals, and it is based on intelligent and automated agents.

Data sciences and analytics are primary and central in this architecture. Instead of assessing the student performance for grading, we have to design a continuous assessment of the student's learning needs and abilities so that timely and targeted help is provided during the student's tenure. We have to provide a model where everyone can succeed - this is possible only if the student is provided all the resources to succeed such that the students' learning abilities, learning styles, and disabilities are taken into consideration. Similarly, we have to make it easy for faculty in the premier institutions to create high quality course content without having to worry about the course customization and how it is repurposed for the target community. Basically, our architecture allows addressing a very large and diverse population by creating small communities within that have similar learning needs and goals.

This is achieved using the existing technologies in the data sciences space. For example, social network analysis, community detection, link predictions, behavioral modelling are leveraged to profile learners and derive meaningful variables predictive of their learning outcomes. Statistical process quality control tools and techniques are tailored to visualize and monitor progress and draw attention to at-risk students. The architecture should have a model to prescribe corrective measures based on models fused from classical tools in educational psychology such as item response theory and modern tools from computational linguistics, natural language processing, artificial intelligence and machine learning.

Author Biography

Raviteja Garlapati is a technology architect at Canopus Consulting. He has nine years of experience in building large scale systems. He has a B.Tech from IIT Kharagpur and specializes in software architectures, semantic computing and high performance computing.

Soma S Dhavala was a research scientist with Dow AgroSciences, prior to joining Canopus Consulting. He worked as a post-doc in

the Dept. of Statistics at Texas A & M University, where he also obtained his Ph.D in Statistics. Prior to that, he obtained a Masters in EE from IIT-Madras and worked as an engineer with GE Global Research Center in Bangalore. His research interests are in dependence modeling, high-dimensional data analysis & visualization, and educational data mining.

Nagaraju Pappu is the Co-Founder and Chief Architect at Canopus Consulting. He has twenty two years of research and industry experience. He specializes in transaction processing, high performance computing, semantic computing. His research interests are in cultural informatics and community computing. He is a visiting faculty to IIT-Kanpur and IIIT-Hyderabad. He is the architect of Agropedia, a community computing platform for Agricultural Knowledge in India, and EduNxt, a large scale e-learning platform that received the prestigious Golden Peacock award for best innovation.