

myHealth : An Integrated Database of Personalised Medicine

Executive Summary:

CloudSeq is a Singapore based company providing complete solution for NGS (Next Generation Sequencing) based Clinical Genomics diagnostics. Built on the established domain expertise and track records of its founders, CloudSeq secured seed funding from National Research Foundation (NRF), Singapore and Expara Pte Ltd (www.expara.com) to develop a Cloud based interactive digital platform that can cater to the burgeoning demand for BIG data management analytics in Life Sciences sector with focus on Genomics data.

Problem Statement:

In this era of Digital Healthcare, the biggest problem is the scattered and inaccessible “personal” healthcare data. Healthcare data, by default, is disparate, unstructured and scattered all-over. Moreover, the impending integration of “omics” based data into personal healthcare data is going to transform the current scenario of simple healthcare data management and analytics into BIG data management and analytics problem that would need the computational power of Supercomputers and Quantum computers. It would be a challenging perspective to integrate disparate personalised healthcare datasets such as phenome (MRI scan, blood tests, XRAYs etc), metabolome (cholesterol levels, blood sugar, vitamins etc.), proteome (insulin, hormones, etc), lipidome (lipid profiling), transcriptome (gene expression levels), exome/genome (expressed and whole genome sequencing), microbiome (skin, gut, vaginal, oral etc) and exposome (environmental and epigenetic factors). It would be even more challenging to analyse this integrated data in a seamless and automated workflow environment to provide accurate and precise healthcare decision support system that would be Cloud based and accessible globally. Hence, an integrated BIG “omics” data management and analysis platform is the critical requirement to achieve effective Practice Medicine practice.

Our Solution:

Our proprietary platform (patent pending) myClinGen (www.myclingen.com) provides the ideal solution to the above stated problem vexing the global Healthcare community to usher in the era of Precision Medicine practice. myClinGen is built to have a highly user friendly and customisable front end to interact with doctors, genetic counsellors and individuals with a robust and highly scalable backend designed to deliver accurate results using thousands of cores using Supercomputing with much shorter TAT (Turn Around Time). We have devised Breast Cancer Precision Medicine Package, Diabetes Precision Medicine Package, Cardiovascular Precision Medicine Package and 360° Wellness Precision Medicine Package to target millions of doctors and individuals globally through our Supercomputer based BIG Data Genomics Analysis Platform. To the best of our knowledge, CloudSeq is the first to create

and use high performance algorithms in an automated workflow on a Supercomputer to analyse BIG “omics” data economically and quickly. myClinGen is both prognostic (preventive) and diagnostic to effectively usher in the era of affordable Precision Medicine at global level through Infiniband Cloud technology.

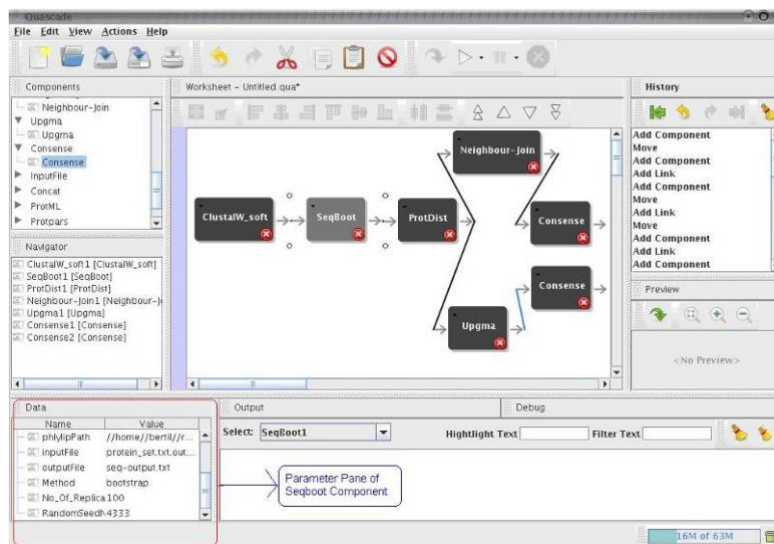
Seed Funding:

CloudSeq succeeded in getting seed funded (Tier, 50K SGD) by Expara Pte Ltd and NRF, Singapore based on their idea of a Cloud based digitally interactive platform for the analysis of NGS data by Life Scientists. Upon the successful showcasing of the prototype in a Cloud environment hosted by A*CRC Singapore, CloudSeq was selected for Tier 2 funding to the tune of SGD 200K. CloudSeq successfully completed the project in 2018 and started to develop sales and marketing in 2019.

CloudSeq was invited to participate in EUREKA Global stars program, sponsored by Enterprise Singapore to promote collaborative projects between Singapore and EU companies with funding to the tune of 80% of the project cost. Seven EU companies have expressed their interest to collaborate with CloudSeq based on our ideology and technology for Precision Medicine. CloudSeq submitted two projects worth ~2 million Euro under this project.

Intellectual Property:

CloudSeq filed for global patent for their innovative high performance algorithm visual-workflows that are highly scalable and distributable in HPC/ Supercomputing environment. Our unique drag and drop mode of algorithm integration with the visual parametric configuration allows AI based automated workflow generation to analyse integrated “omics” data. These workflows can be made accessible to the end users, in real-time, to have complete confidence in the critical Precision Medicine data analysis in a transparent fashion unlike many of our competitors who provide “black-box” solutions that simply generate a PDF report. We have reached the second phase of the application procedure after successfully clearing the initial round search at global level. We have filed National level patent applications for Australia, New Zealand, UK and Hong Kong, which is currently pending. We plan to file for IP rights in USA, China and India soon.



Sales & Marketing:

According to Global Market Insight (Feb 2020), “the Global Precision Market is set to exceed USD 119 bn by 2026. The rising prevalence of Cancer across the globe will significantly boost the market in the forthcoming years”.

Even though we were not funded for Sales & Marketing, with our MVP (Minimal Value Product) we ventured into the market by tying up with reputed distributors for S&M of our product. We have signed MOUs with GenMedic SdnBhd and iHeal SdnBhd based in KL for the distribution of our product in SEA and China markets.

We have also signed an MOU with an MNC, Cereus Health, a New Zealand based Digital Health company which owns a healthcare platform called ManageMyHealth (www.managemyhealth.com.au) for S&M in New Zealand, Australia, USA, UK and India. We have successfully integrated the front end of myClinGen platform with ManageMyHealth platform for promoting our services in the above said territories.

myClinGen Workflow:

1. Genome testing ordered by a Clinician/GP based on the requirements of the end user
2. Saliva sample collection using a third party Saliva sample collection kit
3. Genomic DNA extraction and sequencing are carried out by our NGS wet-lab partners Genome Institute of Singapore (GIS)/ MacroGen Pte Ltd in a CLIA/ CAP accredited lab under SLA.
4. The raw sequencing data generated (FastQ) is transferred to A*CRC/NSCC using a high speed Infiniband connectivity.
5. ClinGen platform is hosted on the A*CRC/NSCC HPC clusters running Hadoop/Spark.
6. Our patented workflows combine several compute intensive algorithms in an automated workflow format to deliver highly accurate and precise results in a very transparent manner unlike any other Genetic testing labs in the world.
7. The results are presented as an innovative ClinGen knowledgebase which is an Integrated Healthcare portal that is interactive and highly user friendly.
8. CloudSeq is in the process of setting up a Medical Advisory Board consisting of internationally acclaimed and ACMG certified Clinical Genomics specialists.
9. Clinicians/GPs can interact with these Clinical Genomics specialists through ClinGen portal to get their advice on myriad Clinical conditions including genetic variant/Gene Expression/ Microbiome based personalized results captured in their individual databases.
10. ClinGen is a dynamic knowledgebase that is intrinsically linked to ClinVar and gets updated automatically as and when new knowledge is added about any variants of unknown significance is updated.