ASHG OpenMendel Workshop

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October 2020

History of Mendel

1. The first version of **Mendel** was created more than $\frac{1}{4}$ century ago. It was originally written in Fortran 77 and distributed in source code of about 4,000-5,000 lines.

2. Classic Mendel was later rewritten in Fortran 2003 and distributed in executable form with yearly updates. It has many more options and reasonable but outdated input and output choices. Classic Mendel is maintained as legacy software.

3. Classic Mendel is burdened by complex memory management, 75,000 plus lines of hard to digest code, and virtually no access to modern libraries for graphing, linear algebra, optimization, and statistics.

The OpenMendel Project

1. The aim is turn Mendel into open source and foster a community of software developers.

2. Written in Julia, OpenMendel allows for more rapid prototyping of new computational methods, better graphics, better parallelization, and better integration with existing bioinformatics software.

3. By storing data on the bit level, it can handle large modern datasets in a integrated analysis pipeline.

The Choice of Julia

1. Julia is viewed by many as the future of scientific programming. It is technically superior to R and Matlab, free and easy to download, loaded with good utilities for big data analysis, and oriented to notebook style of statistical analysis.

2. Julia is specifically designed for high-performance numerical and scientific computing. Mostly likely it will replace Matlab over the next decade. It relies on a just-in-time compiler, so code runs much faster than R or Matlab code. R, Fortran, and C code is callable by Julia. Parallel computing is a major thrust. Julia fosters the writing of compact readable code. Graphics support is weak but improving.

OpenMendel Contributors

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Current OpenMendel Options

#	Analysis Option	#	Analysis Option
1	VCFTools	11	MendelAimSelection
2	SnpArrays	12	MendelKinship
3	MendelImpute	13	MendelGeneticCounseling
4	MendelPlots	14	MendelTwoPointLinkage
5	MendelSearch	15	MendelLocationScores
6	MendelBase	16	MendelGameteCompetition
7	MendelGeneDropping	17	MendelGWAS
8	TraitSimulation	18	OrdinalGWAS
9	MendelEstimateFrequencies	19	MendelIHT
10	ADMIXTURE	20	VarianceComponentModels