Floc Size And Count App (Floc App)

Introduction

Turbidity measurements provide the primary source of performance monitoring at many water treatment plants. Turbidity provides an excellent way to measure overall plant performance, but it does not provide insight as to why the water treatment plants are performing well or poorly. The Floc Size and Count App team aims to overcome this problem by creating a tool for operators to analyze flocculation as a means to understand plant efficiency and performance as well as to understand the underlying reasons for this.

Fall 2017

This semester, the team went through a little change by losing two members and gaining two new ones. The new members started to learn LabVIEW as the floc app development continued. Time stamps were added to support functionality if the program were to be run for a long time. A documentation of the code was created. The team is working on data representation.

Spring 2017

This semester, the team has primarily worked on improving the data outputted by the Floc App. Distances in a computer are originally stored in units of pixels (tiny squares that are combined together to form store and display digital images). This unit must be converted to micrometers (a physical unit of length) using some scaling constant. The Floc App originally had this factor fixed, which would provide inaccurate measurements for different lab setups. To deal with this, the team created a function that allows a user to set this factor.

The app also needs a way to calculate the volume in focus in order to properly scale the data. By design, different camera setups have different depths of field. Because of this, some cameras may be capable of analyzing larger flocs. To deal with this, the team has decided to use the volume in focus (determined by the depth of field and the width/height of the camera) to scale the frequencies of the data obtained from the Floc App. This volume is also calculated using the same function.

The Floc App originally measured the maximum Feret diameter of particles. This measures the longest possible distance between two points in a particle. the team decided that this was a poor measure of size since thinner particles will be perceived as larger under this metric. The team still wished to measure sizes in terms of diameters, so it was decided that the program would measure "estimated diameters." To do this, the area of the floc is measured and the object is assumed to be a circle. Simple geometry is then used to calculate an estimated radius and then diameter. This is better than our previous measurement since the area the floc takes up on the screen is taken into account.

In addition to the charts originally generated by the Floc App, the team has added a csv spread sheet that is generated after each test. The data on this file includes both the estimated diameter of an analyzed floc and the time at which the data was collected. The team decided to use a csv as opposed to a standard Excel file to allow for more compatibility with different platforms, such as Python.

AguaClara has recently acquired high-end Grey Point cameras, which the team wishes to use with the Floc App. Unfortunately, technical difficulties have kept the team from using these devices.

Fall 2016

The goal of the Floc App team this semester is to create a user-friendly continuous analysis program and its executable to be used in the AguaClara labs and plants. This will be a great way for the team to get user feedback to further develop the program according to user needs. The team also aims to design an easy-to-use hardware component that is compatible with the software. The team is also working on adding comments to the existing code to make it easier to understand the processes from an outsider point of view.

Spring 2016

The team started the implementation of an easy-to-use desktop application that would measure floc size distribution that is written in LabVIEW. The team completed image acquisition and analysis parts for the final application. The connection of these two separate programs were not finished this semester. Th e team also increased readability of the existing code by the partitioning the code into subsections via the creation of functions.\

Members

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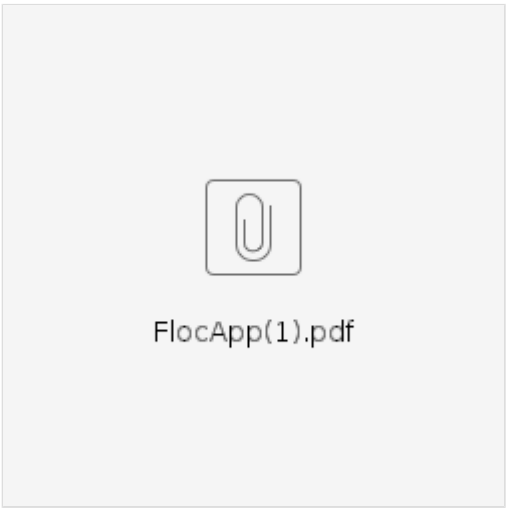
Documents

	Challenges	Tasks	Symposium	Final Presen

Fall '17				Final Presen
Spring '17			 	Spring Spring
Fall '16				Floc A Floc A

Spring '16	? Unknown Attachment	 sp16tasks.pdf	? Unknown Attachment	Floc A Power