CLASS DIAGRAM

```
┌──────────┐                ┌──────────┐          ┌──────────────┐
│   main   │                │ csvdata  │──────────│  validatedto │
└──────────┘                └──────────┘          └──────────────┘
     │1
     │
┌──────────────┐                    ┌─────────────────────┐          ┌──────────────┐
│ main window  │                    │   csvdataassembler  │          │ dtoassembler │
└──────────────┘                    └─────────────────────┘          └──────────────┘
     │1
     │1
┌──────────┐                        ┌──────────────┐                 ┌──────────────────┐
│ load_csv │────────────────────────│  verify_csv  │                 │  publicationdto  │
└──────────┘                        └──────────────┘                 └──────────────────┘
     │         ┌────────────┐      ┌───────────────────────────┐     ┌──────────────┐
     │         │ treelist_vo│──────│ <<struct>> string_data_object │  │   GrantDTO   │ 1
     │         └────────────┘      └───────────────────────────┘     └──────────────┘
┌──────────────┐                                                     ┌──────────────┐
│ analyze_csv  │─────────────────────────────────────────────────── │  TeachingDTO │
└──────────────┘                                          1          └──────────────┘
     │   ┌──────────────────────────────┐                            ┌──────────────────┐
     │   │  graph_combo_box_populator   │                            │  PublicationDTO  │
     │   └──────────────────────────────┘                            └──────────────────┘
┌──────────────┐    ┌──────────────────────┐            ┌──────────────────────┐
│ tree_list_vo │    │  graphvisualizations │            │  grant_bargraph1_vo  │
└──────────────┘    └──────────────────────┘            └──────────────────────┘
                                   │1                   ┌──────────────────────┐
                              n    │                    │  teach_bargraph1_vo  │
                         ┌──────────────┐               └──────────────────────┘
                         │ qcustomplot  │               ┌──────────────────────┐
                         └──────────────┘               │     bargraph_vo      │
┌──────────────────────────────┐                        └──────────────────────┘
│ date_filter_combo_populator  │                                      1
└──────────────────────────────┘
```
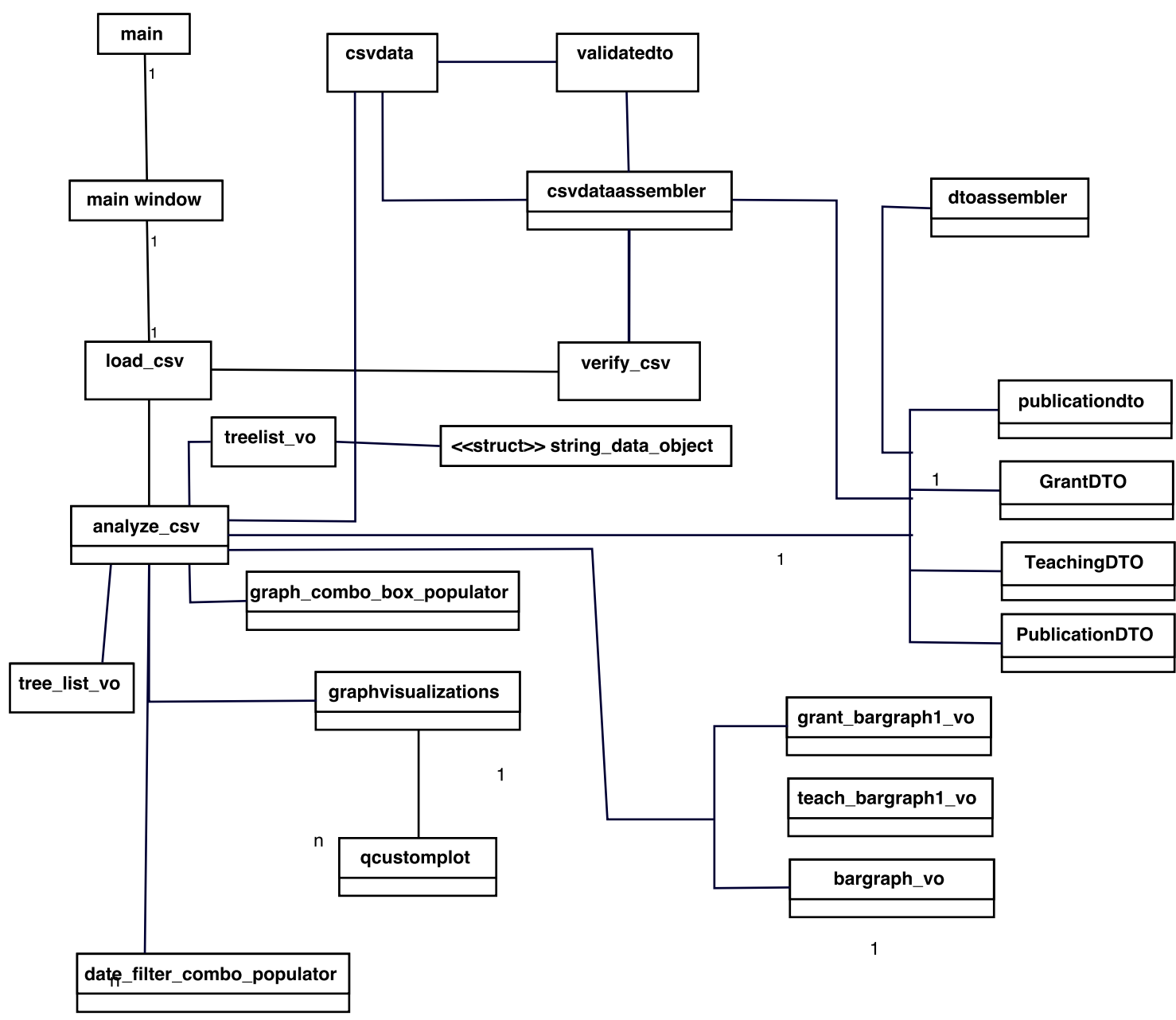
analyze_csv

- ui: AnalyzeCSV
- scene: QGraphicsScene
- customPlot: QCustomPlot
- p_tree: tree_list_vo
- teach_tree: tree_list_vo

- get_ui_pointer
- on_load_btn_clicked()
- on_verify_btn_clicked()
- on_filter_btn_pres_clicked()
- on_filter_btn_teach_clicked()
- on_filter_btn_pub_clicked()
- on_filter_btn_grant_clicked
- populate_publication_tree()
- populate_grant_tree()
- populate_teaching_tree()
- populate_presentation_tree()
- populate_publication_bargraph()
- populate_grant_bargraph()
- populate_teaching_bargraph()
- populate_presentation_bargraph()

bargraph_vo

+ name: string
+ maxY: double
+ yearLabel: QVector<Qstring>
+ yearTick: QVector<double>
+ field2: QVector<QString>
+ values:
QVector<QVector<double>>
+ values: vector<vector<int>>

+ Bargraph_VO()

csvdataassembler

+ AssembleData
(data: CSVData<PublicationDTO>,
filename: string)

csvdata

+ nMan: int
+ errorRows: vector<vector<string>>
+ dtos: vector<DTOType>
+ header: vector<string>

+ CSVData()
+ addError(vector<string>)
+ addDTO (dto: DTOType)
+ validateErrors()

date_filter_combo_populator

+ PopulateDateCombo(data: shared_ptr
<CSVData<GrantDTO>>)

+ PopulateDateCombo(data: shared_ptr
<CSVData<TeachingDTO>>)

+ PopulateDateCombo(data: shared_ptr
<CSVData<PresentationDTO>>)

+ PopulateDateCombo(data: shared_ptr
<CSVData<PublicationDTO>>)

dtoassembler

+ assembleDTO (dto: PublicationDTO, f:
vector<string>)

grant_bargraph1_vo

+ name: string
+ years: vector<string>
+ grantTypes: vector<string>
+ values: vector<vector<int>>

+ Grant_BarGraph1_VO
(data: shared_ptr<CSVData<GrantDTO>>,
start: int, end: int)

graphvisualizations

+ plot_bargraph (customPlot:
QCustomePlot, vo:

+ plot_grants_vs_trials(plot: QCustomPlot,
bargraph_vo: Grant_BarGraph1_vo)

+ plot_pubtype_vs_date (plot:
QCustomPlot)

+ plot_teaching_vs_course (plot:
QCustomPlot, barograph_vo:
Teaching_Bargraph1_vo)

grantdto

+ memberName: String
+ domain: String
+ fundingType: String
+ status: String
+ role: String
+ title: String
+ pInvestigator: String
+ startDate: unsigned int
+ endDate: unsigned int
+ totalAmount: float
+ cInvestigator: shared_ptr<vector<string>>
+ shortTitle: String
+ applicationSummary: String
+ grantPurpose: String
+ area: String
+ grantNum: String
+ administeredBy: String
+ fundingSource: String
+ project : String
+ currency: String
+ personnelPaid: String
+ proratedAmount: float
+ receivedAmount: float
+ memberShare: float
+ HrPerWk: float
+ treePath: vector<string>
+ treeValues: vector<double>
+ peerReviewed: String
+ industryGrant: String
+ monetary: String
+ rpt: String
+ rnw: String
+ edGrant: String
+ dupReported: String

+ getName(): string
+ getBarField1(bType:int)
+ getBarField2(bType:int)
+ getBarValue(double)
+ getYear(bType: int)
+ getTreePath(bType: int)
+ getTreeValues(bType: int)

graph_combo_box_populator

+ PopulateGraphComboName(tdata:
shared_ptr <CSVData<PublicationDTO>>)

+ PopulateGraphComboType(tdata:
shared_ptr <CSVData<PublicationDTO>>)

+ PopulateGraphComboName(tdata:
shared_ptr <CSVData<PresentationDTO>>)

+ PopulateGraphComboType(tdata:
shared_ptr <CSVData<PresentationDTO>>)

+ PopulateGraphComboName(tdata:
shared_ptr <CSVData<GrantDTO>>)

+ PopulateGraphComboFunding(tdata:
shared_ptr <CSVData<GrantDTO>>)

+ PopulateGraphComboProgram(tdata:
shared_ptr <CSVData<TeachingDTO>>)

load_csv

- ui: LoadCSV

- verify_csv_page: VerifyCSV

- analyze_csv_page: AnalyzeCSV

- filename: QString

- recentFilesList: QStringList

- recentFilesModel: QStringListModel

- csvType: int

- on_verify_btn_clicked()

- on_analyze_btn_clicked()

- on_publication_btn_clicked()

- on_grant_btn_clicked()

- on_presentation_btn_clicked()

- on_teaching_btn_clicked()

addRecentFile(file: QString)

+ LoadCSV(parent: QWidget)

main

+ main: int

main window

- ui: MainWindow

- load_cv_page: LoadCSV

+ MainWindow (parent: QWidget)

- on_open_program_clicked()

presentationDTO

+ name: String

+ domain: String

+ type: String

+ role: String

+ title: String

+ date: unsigned int

+ activityType: String

+ geoScope: String

+ host: String

+ country: String

+ province: String

+ city: String

+ attendeeNum: String

+ hours: String

+ teachScore : String

+ presentation: String

+ remarks: String

+ citation: String

+ personalRenumeration: String

+ authorship:
shared_pt<vector<string>>

+ presentationDTO()

+ getName(): string

+ getBarField1(bType:int)

+ getBarField2(bType:int)

+ getBarValue(bType:int)

teach_bargraph1_vo

+ name: string

+ years: vector<string>

+ teachTypes: vector<string>

+ values: vector<vector<int>>

+ Teach_BarGraph1_VO
(data: shared_ptr<CSVData<TeachDTO>>,
start: int, end: int)

publicationdto

+ name: String

+ domain: String

+ journalName: String

+ title: String

+ ISBN: String

+ status: String

+ type: String

+ role: String

+ date: unsigned int

+ id: unsigned int

+ authors: shared_ptr<vector<string>>

+ volume: String

+ issue: String

+ pageRange: String

+ DOI : String

+ website: String

+ publisher: String

+ personalRenumeration: String

+ traineeDetails: String

+ mostSignificantDetails: String

+ pubmedID: String

+ authorNumber: String

+ impactFactor: String

+ peerReviewed: String

+ international: String

+ presentation: String

+ mostSignificant: String

+ education: String

+ treePath: vector<string>

+ treeValue: vector<double>

+ publicationDTO()

+ getName(): string

+ getBarField1(bType:int)

+ getBarField2(bType:int)

+ getBarValue(bType:int)

+ getYear(bType: int)

+ getTreePath(bType: int)

+ getTreeValues(bType: int)

teachingdto

+ name: String

+ domain: String

+ program: String

+ type: String

+ scope: String

+ hourSession: float

+ numberSession: float

+ totalHours: float

+ startDate: unsigned int

+ endDate: unsigned int

+ institution: String

+ faculty: String

+ department: String

+ division : String

+ location: String

+ facultyComments: String

+ students: String

+ lecture: String

+ development: String

+ stipend : String

+ comment: String

+ teachingDTO()

+ getName(): string

+ getBarField1(bType:int)

+ getBarField2(bType:int)

+ getBarValue(bType:int)

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treelist_vo

+ treelist_vo(data: shared_ptr <CSVData <DTOType>>, start:int, end:int, type:int))

+ addbranch (node: TreeList_Node, dto: DTOType, depth: size_t)

+ makeQTreeNode (parent: QType, node: TreeList_Node)

+ makeQTree (tree: QTreeWidget)

<<struct>> TreeList_Node

+ label: string

+ children: vector<TreeList_Node>

+ value: double

---

tree_list_vo

+ num_pub_types: int

+ num_grant_types: int

+ num_funding_types: int

+ num_teach_types: int

+ parent_set: vector<string_data_object>

+ child_set: vector<vector<string_data_object>>

+ tree_list_vo()

+ populate_for_publications (_data: shared_ptr<CSVData<PublicationDTO>>)

+ populate_for_grants (_data: shared_ptr<CSVData<GrantDTO>>)

+ populate_for_teaching (_data: shared_ptr<CSVData<TeachingDTO>>)

+ populate_for_presentations :(_data: shared_ptr<CSVData<PresentationDTO>>)

+ get_parent_set()

+ get_child_set()

- find_label_index(label: string, set: vector<string_data_object>)

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validatedto

+ trimLeft (s: string)

+ trimRight(s: string)

+ trimString(s: string)

+ validateString(s: string)

+ isLeapYear(y: int)

+ makeDate(s: string)

+ validateDate(s: string)

+ validateAuthorName(s: string)

+ makeAuthors(s: string)

+ makeMoney(s: string)

+ validateMoney(s: string)

+ validateAuthors(s: string)

+ validatePublications (fields: vector<string>)

+ validateGrant (fields: vector<string>)

+ validatePresentation (fields: vector<string>)

+ validateTeaching (fields: vector<string>)

<<struct>> string_data_object

+ label: string

+ num: double

+ num2: double

+ value: double

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verify_csv

- ui: VerifyCSV

- analyze_csv_page: AnalyzeCSV

- data_pub: shared_ptr <CSVData <PublicationDTO>>

- data_grant: shared_ptr <CSVData <GrantDTO>>

- data_teach: shared_ptr <CSVData <TeachingDTO>>

- data_pres: shared_ptr <CSVData <PresentationDTO>>

- dtoType: int

- assembled: bool

+ verifyVSC (filename: QString, csvType: int, parent: QWidget)

- on_load_btn_clicked()

- on_analyze_btn_clicked()

- on_ignoreall_btn_clicked()

- on_ignore_btn_clicked()

- onDataChanged(topLeft: QModelIndex, bottomRight: QModelIndex)

-PublicationTableModel()

-PublicationTableModel()

- on_confirm_btn_clicked()

- enableConfirmChanges()