Statistical Analysis Using R
or
An Introduction to the R-ArcGIS Bridge

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Session overview

• Topics
  - Our data science problem and getting started with the R-ArcGIS Bridge
  - Case study using Empirical Bayes Estimation
  - Integrating R functionality into geoprocessing script tools
Defining the R-ArcGIS Bridge

ArcGIS Pro

R

R-Workspace (RStudio)

ArcGIS
Who can use the R-ArcGIS Bridge?

ArcGIS users

ArcGIS

R Script

R

R users

ArcGIS

R

ArcGIS developers

ArcGIS

R

R
Prerequisites

• ArcGIS 10.3.1 or later or ArcGIS Pro 1.1 or later
  Note: Preinstalled with ArcGIS Pro 2.0

• R Statistical Computing Software, 3.2.0 or later

• 32-bit version required for ArcMap, 64-bit version required for ArcGIS Pro
  Note: the installer installs both by default

• 64-bit version can be used with ArcGIS Pro, or with ArcMap by installing Background Geoprocessing and configuring scripts to run in the background.
Installing the R-ArcGIS Bridge

ArcGIS Pro

Project > Options > Geoprocessing

R-Workspace (RStudio)

1) Load R-ArcGIS bridge library
2) Connect to ArcGIS

```r
library(arcgisbinding)
arc.check_product()
```
What Can the R-ArcGIS Bridge Do?

- Read and write spatial data (i.e. shapefile, geodatabase)
- Convert between R data types and Esri data types
- Convert between WKT/WKID and PROJ4 projection strings
- Set the geoprocessing environment
- Set progress bar and messages for geoprocessing
1) Open ArcGIS data, tables, layers

```r
R-Workspace
```

Load data

```r
ArcGIS
```

```r
gis_data <- arc.open(path = 'C:/Data/Seagrass.shp')
```

2) Load dataset to R data frame

```r
R_data <- arc.select(gis_data, fields, SQL, spatial ref)
```
3) Convert ArcGIS data to sp objects

data_sp <- arc.data2sp(R_data)
Integrating R functionality into geoprocessing script tools
Why create script tools?

- Automation
- Repeatability
- Sharing
- Ease of use / Accessibility
- Empowering for the non-R pro
Create script tool in R

- Generic, reusable script template

Wrapping functionality

```
tool_exec <- function(in_params, out_params) {

}
```

Defining input and output parameters

```
input_dataset <- in_params[[1]]
training_pct <- in_params[[2]]
dep_variable <- in_params[[3]]
indp_variable <- in_params[[4]]
test_data <- in_params[[5]]

pred_points <- out_params[[1]]
pred_surface <- out_params[[2]]
```
Create script tool in ArcGIS Pro

1) Create toolbox
2) Add R script
3) Set parameters
4) Perform analysis
What’s next?

Training courses

• Web course: *Using the R-ArcGIS Bridge*
• Web course: *Integrating R Scripts into ArcGIS Geoprocessing Tools*
• Learn ArcGIS Lesson: *Analyze Crime Using Statistics and the R-ArcGIS Bridge*
• GeoNet - https://geonet.esri.com/groups/rstats/activity
• GitHub - https://r-arcgis.github.io/
• arcgisbinding vignette - https://r-arcgis.github.io/assets/arcgisbinding-vignette.html
• R resources / Google it!